Title: Umbrella Device

FIELD of the Invention

~~Specification~~

The present invention relates to an umbrella device ~~in accordance with the preamble of claim 1~~.

Background of the Invention

Umbrella devices in the form of umbrellas and parasols are known, whose umbrella-like cap is provided with ribs, one end of which is linked to a ring arranged at the upper end of ~~the~~ shank and the other end at a sleeve, which can be displaced and fixed in place along the shank for spreading the umbrella cap.

These ribs are required for supporting the cover material used as the covering. In case of umbrella devices of larger dimension, the ribs already constitute a large proportion of the dead weight of the umbrella device. With a filigreed weight-reducing design they are prone to buckling when strained by wind. The controlled folding up of the cover material ~~used as strain~~ and of the rods produces strain has been shown to be technically difficult with umbrella devices of large surface areas and poses the danger of damage to the thin cover material of low flexural strength in the contact points between the cover and the ribs.

An umbrella device ~~in accordance with the preamble of claim 1~~ is known, for example, from US-A-5 020 557 and from Patent No. EP-A 0 382 122. In the first case, the umbrella-like cap is rotatingly held for absorbing and compensating wind forces. In the second case, the umbrella-like cap has two elements arranged on top of each other, wherein the upper cap element can be manually rotated with ~~in~~ respect to the lower, fixed-in-place cap element by preselected degrees of angle for filtering out undesirable sunlight components. Such umbrella devices with a manually rotatable cap

are relatively expensive to produce and elaborate in use, since they can be opened up only over provided ribs, which moreover have a considerable weight.

7 Summary of the Invention

It is the object of the present invention to ~~create~~ provide an umbrella device of the type mentioned at the outset which, while avoiding the above mentioned disadvantages, can be opened up and folded again in a simpler, and in particular automatic way.

~~The characteristics mentioned in claim 1 are provided for attaining this object.~~ a3

A light-weight umbrella device which can be automatically opened up is created by means of the steps in accordance with the present invention, which can be mechanically simplified and can be produced with a large area in particular. The umbrella device moreover provides an active ventilation of the space underneath the umbrella-like cap.

A preferred arrangement of the motor drive and of the holder of the membrane on the power take-off shaft results from ~~the characteristics of claim 2 or claim 3~~. a4

In a preferred manner, the motor drive can be realized either by means of an electric motor of small dimensions, a pneumatic or also a hydraulic drive mechanism. The energy supply for the motor drive is received in the shank ~~characteristics in accordance with claim 6 are provided~~ for achieving a weather protection for it and/or to avoid spoiling the appearance. As an energy supply for a pneumatic drive mechanism, the shank itself can constitute the air-conducting tube.

The ~~characteristics in accordance with claim 7 can be~~ a5 suitably employed for improving the aerodynamic stability of the umbrella device. For example, a shape of the cap ~~in accordance with the characteristic of claim 8~~ can include ballast which can be useful.

~~The characteristics in accordance with claim 9~~ are also advantageous for improving the aerodynamic stability of the umbrella device. ~~Embodiments~~ Favorable embodiments thereof ensue from ~~the characteristics of claims 10 and/or 11~~.

A further option for improving the aerodynamic stability and/or the unfolding process of the umbrella-like cap of the umbrella device results, ~~if the characteristics of one or several of claims 12 to 17 are provided~~.

Further details of the present invention can be taken from the description which follows, in which the present invention is described in greater detail and explained by means of the exemplary embodiments represented in the drawings. ~~Shown are in:~~

Brief Description of the Drawings

Figs. 1A and 1B, illustrate an umbrella device in accordance with a preferred exemplary embodiment of the present invention in an opened-up operating position in a schematic perspective view or a schematic lateral view,

Fig. 2, illustrates the umbrella device in accordance with Fig. 1 in a schematic lateral view, but in the folded-up position of rest,

Fig. 3, illustrates a representation corresponding to Fig. 1B, but in accordance with a second embodiment of the present invention,

Figs. 4A, B to 8A, B, illustrate representations corresponding to Fig. 1A, or partial enlargements in accordance with the circles IV to VIII, but in accordance with further exemplary embodiments of the present invention,

Fig. 9, illustrates a representation of a further embodiment corresponding to Fig. 1B,

Fig. 10, illustrates a representation of a further embodiment corresponding to Fig. 1B,

Fig. 11, illustrates still another embodiment of the present invention during the opening-up process in a schematic lateral view.

Description of the Preferred Embodiments

The umbrella device 10, 110 or 210 represented in the drawings has a ribless, umbrella-like cap 11, 111 or 211, which is rotatably maintained at the upper end of a shank 12, 112 or 212 and can be rotatably driven in such a way, that the umbrella-like cap 11 can be opened-up from a drooping, limp position of rest into an umbrella-like operating position, can be maintained opened up and stabilized by the centrifugal force resulting from its rotation.

In accordance with Fig. 1B, the upwardly extending shank 12 is maintained fixed in place, for example fastened underneath the bottom surface 13 on a block 14. A motor drive 15 is fastened or flanged at the upper end of the shank 12, whose vertically upwardly projecting drive shaft 16 is connected, fixed against relative rotation, with a lower disk 17 which, together with an oppositely located upper disk 18 is a part of a fastening device 19 for the cap 11.

The umbrella-like cap 11 essentially consists of a membrane 21 made of a light material of low flexural strength, but having tensile strength. The membrane 21 has a circular base surface and is fastened around its center between the two disks 17 and 18 of the fastening device 19, wherein the two disks 17 and 18 are typically arranged centered with respect to the circular peripheral edge 22 of the membrane 21. Maintaining the membrane 21 on the fastening device 19 can be provided in a manner not represented, for example by clamping the two disks 17, 18 against each other.

In the position of rest represented in Fig. 2, the membrane 21 is arranged around the shank 12, limply drooping down from the fastening device 19. It should be understood that the ratio between the membrane diameter and the shank length can be selected in accordance with conventional umbrellas or parasols. If the

motor drive 15 which, in the exemplary embodiment represented here is an electric motor drive, is switched on, the membrane 21 is caused to rotate, for example in the direction A (Fig. 1A), because of which the membrane 21 is raised in the direction of the arrows B because of the centrifugal forces acting on it, until it has attained the opened-up, here approximately horizontal operating position, represented in Figs. 1A and 1B. In this operating position, the rotation (arrows A) of the membrane 21 lasts as long as the umbrella-like cap 11 is intended to be kept opened up. The required size of the rotating speed is a function of various factors, such as weight, exterior effects, and the diameter of the membrane 21, as well as the amount of the possible additional ballasting. To fold the membrane 21 into the position of rest or parked position in accordance with Fig. 2, the motor drive 15 is switched off or the speed of rotation is steadily reduced.

The embodiment in accordance with Fig. 3 shows an umbrella device 10a with a pagoda-shaped cut-out shape of the umbrella cap 11a matched to the specific influencing variables.

Figs. 4 to 8 show embodiments of umbrella devices 10b to 10f, whose umbrella-like caps 11b to 11f or membranes 21b to 21f are equipped with ballasting 30 of different kinds. In accordance with Fig. 4, the membrane 21b is provided with annular cords 31 which, in accordance with Fig. 4B are covered and held by a strip 36 made, for example, from the material of the membrane.

Fig. 5 shows ballasting 30 in the form of radial cords 32, which are maintained on the top or the underside of the membrane 21c, for example also by means of strips 37.

Fig. 6 shows an edge cord 33 as ballasting, which is held in an edge seam 38 of the membrane 21d.

In the embodiment in Fig. 7, the ballasting 30 is formed by individual masses 34, which are fastened in an evenly distributed arrangement on the outer edge 29 of the membrane 21e.

Finally, Fig. 8 shows ballasting 30 at the peripheral edge, for example by means of an annular doubling 35 of the material of the membrane 21f.

An improvement of the aerodynamic stability and the opening process when the rotating process is started results from the ~~said~~ ballasting.

The embodiment in accordance with Fig. 9 shows an umbrella device 10a' with a double-layered cap 11a', whose upper, 25, and lower layer 26 are each maintained at an upper, 19a, and lower fastening device 19b.

The umbrella device 110 represented in Fig. 10 has a cap 111, wherein the membrane 121 is embodied as a flat cushion with an upper membrane layer 41 and a lower membrane layer 42, which are connected along the outer edge. The two membrane layers 41 and 42 are divided into individual chambers 44 by means of intermediate walls 43. In the exemplary embodiment, the radial and/or ring-shaped chambers 44 are filled with air, wherein the interior pressure to be built up in the chambers 44 can be provided in different ways during start-up and during rotation in the operating position. For this purpose, the membrane 121 or its chambers 44 are connected in a manner not represented with a blower. The interior pressure built up in the chambers 44 can also be temporarily limited in the operating phase. It is for example possible to increase the interior pressure during the duration of external effects, such as increased wind strain, and to reduce it during phases of reduced effects, or even to evacuate the chambers 44.

In the umbrella device 210 represented in Fig. 11, the shank 212 is provided with outlet openings 46 in its upper area covered by the membrane 212 in the position of rest, which are arranged in the wall of the hollow shank 212, for example distributed over the circumference and at several heights. The hollow shank 212 is connected with a blower 47. The compressed air generated by the blower 47 is conducted through the hollow shank 212 and can exit through the outlet openings 46. It is possible by means of this compressed air flow 48 to effectively aid the opening process of the membrane 221, which here has the shape of the membrane 21 in accordance with Figs. 1 and 2, during the rotation of the membrane 221 (arrow A). After having attained the operating position of the membrane 221, the blower 47 can be switched off.

While the motor drive 15 is represented as an electric motor in the exemplary embodiments shown in the drawings, whose electrical feed line can be conducted through the hollow shank 12, 112, 212, it is provided in accordance with an embodiment not represented to design the motor drive 15 as a pneumatic drive. It is possible to use the blower 47 in accordance with Fig. 10 for this, in which the underside of the fastening device 19 is embodied in the form of a wind wheel, for example. With this arrangement the ~~said~~ outlet openings 46 are designed to be closable. It should be understood that such a pneumatic drive mechanism can also be advantageous in connection with the exemplary embodiment in Fig. 10.